out of consideration the Echinodermata, in which Johannes Müller's acuteness everywhere recognized traces of bilateral arrangement, such are to be found amongst the Cœlenterata, for example, in the 12-rayed *Philomedusa Vogtii*, and in the young brood of the equally many-rayed *Cunina Köllikeri*. The radiate structure is exhibited, on the contrary, with the greatest strictness in many four-rayed Discophora, and in the biradiate Ctenophora, which therefore prove, even in this respect, to be true Cœlenterata.

PROCEEDINGS OF LEARNED SOCIETIES.

ZOOLOGICAL SOCIETY.

January 14, 1862.—Dr. J. E. Gray, F.R.S., V.P., in the Chair.

DESCRIPTION OF SPHYROCEPHALUS LABROSUS*, A NEW BAT FROM OLD CALABAR RIVER, WESTERN AFRICA. BY ANDREW MURRAY, ASS. SEC. R. HORTICULTURAL SOCIETY.

PTEROPINI.

SPHYROCEPHALUS, nov. gen.

Dental formulary:—

		Molars.	
Incisors.	Canines.	Premolars ?	True molars ?
$\frac{4}{4}$	$\frac{1}{1}$	$\frac{1}{2}$	$\frac{2}{3}$

Head very large and oblong; the lips largely developed and expanded. Ears rather large, without tragus. Thumb and index-finger of hand unguiculate, the other fingers without claws. Tail wanting.

SPHYROCEPHALUS LABROSUS, sp. nov.

Brown, with a few whitish hairs at the base of the ears. The head very large, massive, half as long as the whole body, oblong, and as broad at the muzzle as at the top of the head, with some resemblance to a hammer, whence the name hammer-headed (*Sphyrocephalus*), rather more than twice as long as deep; ears rather large, destitute of tragus; eyes rather large; eyelids provided with eyelashes; nostrils large and tubular; lips extraordinarily developed;

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* Since this paper was in print, the last number of the 'Proceedings of the Academy of Natural Sciences of Philadelphia' has been received in this country (the first copies arrived on 19th February, 1862); and in it I find a description of a new Bat, which probably belongs to this species, by Dr. Harrison Allen (Proc. Acad. Nat. Sc. Phil. July 1861, p. 156). It is said to be taken from a specimen collected by M. Du Chaillu, and is named by Dr. Allen *Hypsignathus monstrosus*. If it is the same species, of course Dr. Allen's name must take precedence. His description does not quite correspond with mine, but, judging from the description of the nose, may, perhaps, have been taken from a dried skin, whereas mine is from a fine example in spirits. M. Du Chaillu has exhibited no specimen of this Bat in England.

both upper and lower lips of a very smooth semi-mucomembranous texture, corrugated and tuberculated at the margins; the upper lip with a tuberculated prominence in the line of the two outer incisors, and a more elongated tuberculated ridge further up, in the line of the two inner incisors; the external lateral margin expanded into a sort of stiff semi-cupshaped flap with a tuberculated edge, rising to meet the nostril and then descending, following its lower edge, and terminating in a curved scroll-like coil in the nostril.

The same semi-mucomembranous lip is spread over the front of the lower jaw, forming a sort of chin. The skin in the neighbourhood of the lips, and extending upwards and backwards along the nasal bones, is covered with the same sort of fine velvety down which surrounds a horse's nostrils; the hair on the rest of the head is flocky; on the downy portion there are on the sides of the upper lip three rows of papillæ, each with a long whisker-hair springing from it. In the specimen before us these papillæ are arranged four in the two first rows and three in the last; similar papillæ and hairs run up the downy space covering the long nasal bones, in three rows, past the eyes and quite to the forehead, numbering each nine or ten papillæ, the middle row being shorter than the two others. The gape of the mouth is large, extending back fully a third of the head; the lip does not encroach on the outside of the face along the gape; it is only directly in front that it is so much developed; the upper lip is connected with the gum by a broad thick ridge uniting them together in the line of the symphysis of the intermaxillary bones.

The disposition of the teeth is as follows:—

They are all well separated from each other, none touching each other except, perhaps, the last molars; the incisors of the upper jaw are minute rounded points; in the lower jaw they are equally minute, but transversely oblong and bilobed. The canine teeth in both are well developed and of the usual form; beyond the canine there is a minute tooth (a mere point) in the lower jaw which is wanting in the upper jaw; the next tooth beyond it is almost exactly of the form of the canine, and is probably a pre-molar; the remaining teeth, two in the upper and three in the lower jaw (probably true molars), have their crown divided longitudinally; in the upper jaw each ridge slopes backwards, in the under jaw the external ridge is bilobed. The palate has strong, elevated, transverse ridges running across from interspace to interspace between each tooth. The tongue is rather large, and covered with a sort of tessellated pavement of large flat papillæ; it is free very far back. Under it and lying in the hollow of the mouth, occupying the whole breadth for a short space in front between the rami of the lower jaw, is a very curious membrane fringed with slips or plaits—a sort of second tongue, calling to recollection a somewhat similar organ or structure under the tongue of the Loris and Lemur. In these it assumes the form of an aponeurotic lamina, which is divided at its anterior thinner end into filaments or slips. "This arrangement (a development of the frænum of the tongue)," says Van der Hoeven, "has been described incorrectly, in my judgment, as though the tongue were double, or even as if a bird's tongue were under the mammalian tongue." It may be a development of the frænum, because two things connected together, although at opposite ends, may always be said to be parts of the same thing however distant they may be. But I would only observe that in the present instance the frænum of the tongue is situated very far back, and it seems to me that it may just as possibly be a development of the floor of the mouth as of the frænum of the tongue. I do not suppose that Dr. Van der Hoeven would think it necessary to look elsewhere than to the walls of the œsophagus to find the structure from which the elongated papillæ lining the œsophagus, in the hawk-billed turtle for instance, had been developed. There is a tendency to similar structure in other parts than the tongue in many animals—on the palate and back of the mouth, for example; and I should not be disposed to seek further than the place from which it springs for the source of this development. It does not extend much further back than the lower canine teeth; but there is a slight plait or perceptible line running on each side all the way to the back of the mouth, giving the appearance of a second thin flat tongue lying in the hollow of the mouth, tied down like the tongue of a crocodile; but the separation here is a mere trace, and it is only the fringed margin in front which is free.

The neck is distinct, and the skin has the appearance of having some cellular space between it and the muscles.

The body is oblong and compact; the ribs descend far, and the lower ribs are very large; the stomach is moderate in size, furnished internally with several large transverse folds; the small intestines are not very long; there is no cæcum.

The arms have the thumb and index unguiculate, the rest of the fingers are without claws; the thumb has two phalanges, the rest have three phalanges. The thumb is united to the wing by a membrane stretching on both sides over the whole of the proximal and half of the distal phalanx; the proximal phalanx of the thumb is shorter than the distal. The winged membrane is not extended across the back, but is very ample; the winged space between the third and fourth fingers, and between the fourth and the body, has in its middle numerous longitudinal bundles of muscular fibre interwoven without attachments, and one or two similar transverse bundles; these are probably for the purpose of assisting in the folding of the wing. Along these bundles of muscular fibre the membranous wing is closely wrinkled; and there is little doubt that they will also strengthen the membrane where they occur.

The hind feet are uniform and all unguiculate; they are united to the body by an interfemoral membrane, which has a single large bundle of muscular fibres stretching obliquely across from the foot to the coccyx.

The testicles are situated under the skin on each side of the male organ, and are round.

There is no tail.

The length of the whole body, in the specimen from which the above description is taken, is nearly 7 inches; the length of the head $3\frac{1}{4}$ inches, its depth about $1\frac{1}{4}$ inch. The stretch of wings is 28 inches across.

The most remarkable features in this animal are its large hammer-shaped head, and the great external development of its lips. Its whole structure is essentially that of a Pteropine Bat, with some modifications showing a tendency towards the *Rhinolophi*. No species having any of the nasal appendages peculiar to that section of the Bats has yet been found among the Pteropine Bats. They are strictly frugivorous, and have the nose like that of a fox or dog. The present species, although it has not any nasal appendages, has labral expansions which may possibly be analogous to them, and the animal may possibly have peculiar habits to which the structure of these organs is especially adapted.

Unfortunately, in the only specimen yet received, the stomach and intestines were wholly empty; so that we cannot speak of its food with positive certainty. The teeth are Pteropine in character, but not so absolutely so as to preclude the possibility of this creature being at least partially insectivorous, the molars showing a tendency to mammillation on the external side of the longitudinal ridges into which they are separated. The large folds in the interior of the stomach seem to point to a vegetable diet.

The sublingual fringed membrane is also an interesting peculiarity, not only on account of its rarity, but because one of the few other instances where it has been noticed is in an animal having no one thing in common with the present, except that of living in the same country. We sometimes see this happen; an abnormal structure or peculiarity occurring in an animal restricted to one country will be found repeated in some other animal of that country no way connected with or allied to it.

This Bat was sent to me by my excellent friend, the Rev. Wm. C. Thomson, one of the missionaries of the United Presbyterian Church of Scotland, stationed at Old Calabar—a true Christian, an excellent naturalist, and one whose devotion to the cause he has undertaken, viz. the amelioration of the African negro, has been proved by the greatest sacrifices from his youth upwards.

Prof. Owen communicated the first part of his paper on the Aye-aye (*Chiromys madagascariensis*, Cuv.), including an introductory historical sketch of its discovery and the various opinions respecting its nature and affinities set forth by naturalists from Buffon to the present time. After commenting on the chief of these, the author proceeded to narrate the circumstances under which the subject of his descriptions, a nearly full-grown male, had been obtained from Madagascar, and prepared for dissection, by the Hon. H. Sandwith, M.D., C.B., whilst Colonial Secretary at the Mauritius. The habits of the Aye-aye during the period in which it lived a captive at the Mauritius with Dr. Sandwith, and also the habits of other individuals that for a time were kept alive in the island of Réunion, by MM. Liénard and Vinsor, in 1855, were next noticed. The specimen submitted to Prof. Owen, having been transmitted well preserved in spirit, afforded the means of a minute external description. The extremities were described as follows:—"The fore leg turns freely in the prone and supine position; it is pentadactyle: the innermost digit stands out at an acute angle with the index, and is opposable to the other digits, making a prehensile hand, but in a less perfect degree than in the old-world or 'catarrhine' quadrumana. The second, fourth, and fifth digits have the ordinary thickness, the fourth being almost twice the length of the second. The third or middle finger is singularly attenuated, is rather shorter than the fourth digit, and is terminated by a slender curved claw. It is this seemingly atrophied digit which the Aye-aye inserts into the burrows of the wood-boring caterpillars, after it has gnawed down to and exposed them by its strong fore teeth, in order to extract the grub. The hind limb is longer than the fore limb, and is terminated by a more perfect hand—the 'hallux' or thumb being stronger, and set at a more open angle with the other toes, and these being more similar to each other in length and thickness: the thumb has a flat, broad nail." Prof. Owen observed that, from the external characters of the Aye-aye, it might be inferred that it was of arboreal habits, the limbs being constructed chiefly for grasping, especially the hinder pair, as in all good climbers. The circular open eye, large iris, and wide pupil, reducible to a minute point when contracted, indicated a climber of nocturnal habits. The large and perfect ears bespoke the acuteness of their sense. The tail, long and bushy, but not prehensile, might add to the protective non-conducting covering of the well-clothed body during sleep. Prof. Owen then proceeded to describe the skeleton of the Aye-aye.

January 28, 1862.—Dr. J. E. Gray, F.R.S., V.P., in the Chair.

Professor Owen concluded the reading of his memoir on the Aye-aye (*Chiromys madagascariensis*), which had been adjourned from the last meeting of the Society. The portions of the structure of this animal successively examined were the dentition, the muscles, the brain, the digestive organs, the organs of circulation and respiration, and the renal and genital organs. The author then proceeded to the comparison of its external characters, its osteology, and its internal structure with those of the Lemurs and Rodents, and showed that in a variety of particulars its nearest approach was to members of the lemurine group. In ordinary zoological or external characters its nearest allies were certain Galagos of Africa (*Otolicnus crassicaudatus* and *O. Alleni*). In conclusion, he entered into the evidence afforded by the peculiarities of this animal on the question of the origin of species, and, after showing the arguments in favour o the derivative hypothesis and those against its mode of operation, as propounded by Buffon, Lamarck, and Darwin, came to the conclusion that, whilst the general evidence on this subject was in favour of creation by law, he was compelled to acknowledge ignorance as to the mode in which such secondary causes might have operated in the origin of *Chiromys*. At the same time he fully admitted that the attempts to dissipate the mystery which environed the origin of species, whether successful or not, could not but be fraught with great collateral advantages to zoological science.

February 11, 1862.—Dr. J. E. Gray, V.P., in the Chair.

Mr. Gould exhibited a specimen of a Lyre-bird (*Menura*) from Port Philip, and pointed out the characters in which it differed from the closely allied *Menura superba* of New South Wales. Mr. Gould proposed the name *Menura Victoria* for this new species.

The following papers were read:—

ON THE ASSUMPTION OF THE MALE PLUMAGE BY THE FEMALE OF THE COMMON PHEASANT. BY EDWARD HAMILTON, M.D., F.Z.S., F.L.S., ETC.

The late Mr. Yarrell, in a communication read before the Royal Society in 1827, "On the Assumption of the Male Plumage in Female Pheasants," drew attention to the fact that this anomaly was not necessarily the accompaniment of age—*i. e.*, in old hen-birds which had done laying; but states that it may occur sometimes from an original internal defect, sometimes from subsequent disease, and sometimes from old age. Dr. Butter, who had written previously on this subject, had stated that this peculiarity only occurred in old birds; and John Hunter, in "An Account of an Extraordinary Pheasant," had the same opinion. He considers that in such cases the female puts on the *secondary* properties of the male, and observes that some classes are more liable than others to this change. He goes on to state "that in animals just born, or very young, there are no peculiarities to distinguish one sex from the other, exclusive of what relates to the organs of generation, which can only be in those who have external parts; and that towards the age of maturity the discriminating changes before mentioned begin to appear, the male then losing that resemblance he had to the female in various secondary properties: this particularly applies to birds. It is evidently the male which at this time recedes from the female, every female being at the age of maturity more like the young of the same species than the male is observed to be; and if the male is deprived of the testes when growing, he retains more of the original youthful form, and therefore more resembles the female. From hence it might be supposed that the female character contains more truly the specific properties of the animal than the male; but the character of every animal is that which is marked by the properties common to both sexes, which are found in a natural hermaphrodite, as in the snail, or in animals of neither sex, as the castrated male or spayed female. They are curious facts in the natural history of animals, that by depriving either sex of the true parts of generation they shall seem to approach each other in appearances."

In some species of animals, that have the secondary properties we have mentioned, there is a deviation from the general rules by the perfect female, with respect to the parts of generation, assuming more or less the secondary character of the male. John Hunter, like Butter, considers that this does not arise from any action produced at the first formation of the animal, nor grows up with it, but seems one of those changes which happen at particular periods. He goes on to describe some hen-pheasants having the plumage in part of the male, and says, "I found the parts of generation to be truly female, they being as perfect as any hen-pheasant that is not in the least prepared for laying eggs, and having both the ovary and oviduct." He says, "From what has been related of these birds we may conclude that this change is one of the effects of age, and obtains to a certain degree in every class of animals. We find something similar taking place even in the human species; for that increase of hair observable on the faces of many women advanced in life is an approach towards the beard, which is one of the most distinguishing properties of man. Thus we see sexes, which at an early period had little to distinguish them from each other, acquiring about the time of puberty secondary properties which clearly characterize the male and female,—the male at this time receding from the female, and assuming the secondary properties of the sex. The female at a much later time of life, when the powers of propagation cease, loses many of her peculiar properties, and may be said, except from mere structure of parts, to be of no sex, even receding from the original character of the animal, and approaching in appearance towards the male."

In the years 1858, 1859, and 1860 this peculiar alteration of structure in the female organs of generation in the Pheasants was particularly prevalent in some parts of England. I had the opportunity of examining many specimens, and was able completely to confirm Mr. Yarrell's views on this subject. Indeed, the majority of the birds were young females, many of them being birds of the year, some being in their first moult. I found also that the plumage varied and approached that of the male, not in accordance with the age of the bird, but with the amount of disease of the generative organs. The greater the destruction of the ovarium and oviduct, the nearer the plumage similated to the male.

For example, in birds with the hen-plumage predominating, the ovarium and oviduct exist as in the fecundating hen, the small ova lying in considerable numbers in the ovarium, the ovarium and oviduct showing dark lead-coloured masses of disease.

In birds with the plumage of the male in a measure exceeding that of the female, the ovarium is considerably diminished in size, dark-coloured, and containing only a few blackened ova; the oviduct is spotted with dark patches, and considerably contracted.

And thirdly, in birds with the male plumage predominating over that of the female, the ovarium is reduced to a small dark amorphous mass, resembling coagulated blood; the presence of ova cannot be detected, and the oviduct is almost entirely obliterated at its junction with the ovarium. Thus it seems that there are three distinct phases in this peculiar abnormal state of the generative functions.

I have also noticed that, in most cases where the male plumage is in excess of the female, the tail-feathers are particularly long, some being as much as 19 inches in length.

Although Mr. Yarrell states that this condition of the female generative organs is not confined to the *Phasianidæ*, and that it has occurred in the gold and silver pheasants, partridges, pea-fowl, common fowl, common pigeon, king-fisher, and common duck, and that other classes of animals are liable to an influence similar in kind, particularly among insects and Crustacea, yet this disorganization is rarely observed except among the *Phasianidæ*, and particularly when these birds are produced in a domestic state, *i. e.* on the present system of breeding pheasants in preserves. Very few *battues* take place in which some of these birds, generally designated mules, are not killed and mixed indiscriminately with the heaps of the slain.

As to the cause of this disorganization, if it occurred only in the old female, or if it were a common occurrence among birds either of different genera or of the same genus, it could be easily accounted for; but when it is generally found existing among a class of birds which are bred in vast numbers in a particularly artificial manner, it leads one to suppose that the cause must be connected with this condition. Whether the eggs laid by a number of females—to whom perhaps, from circumstances, too few males have been admitted—have been properly fecundated, and therefore the chick improperly formed, remains a subject for future consideration.

MISCELLANEOUS.

On Mesozoic Forms of Life in Australia.

To Wm. Francis, Ph.D., F.L.S.

My dear Sir,—I learn from a correspondent at Melbourne, Mr. J. S. Poore, that during his visit to King George's Sound, Western Australia, he there dredged up, from 8 fathoms, a living Encrinite. The stem, which was attached to a stone, was about 6 inches long; the arms about 1½ inch, of a beautiful rose-colour, or pink, fading to white.

This, in connexion with Stutchbury's discovery of a living *Trigonia* at Port Jackson, and other evidences of mesozoic life at the Antipodes, noticed in the published descriptions of the fossil marsupials of British oolites, is an interesting fact. Faithfully yours,

British Museum, May 19, 1862. Richard Owen.

On the Development of Actinotrocha branchiata.

By Dr. A. Schneider.

Krohn first discovered that *Actinotrocha* is the larva of a Sipunculide (Müller's 'Archiv,' 1858, p. 293). In his investigations, however, the passage into the worm took place so rapidly that he could obtain only a very imperfect notion of the nature of the metamorphosis. At the time when I was engaged in Heligoland with investigations upon the same subject, Claparède published (in Reichert and Dubois's Archiv, 1861, p. 538, taf. 2. figs. 1–6) the exact description of a Sipunculide, which, as Claparède himself asserts, was not fully developed. I believe I may assume with tolerable certainty that this is derived from an *Actinotrocha*. Krohn's discovery was made upon a new species. I succeeded with *Actinotrocha branchiata*, not only in ascertaining the Sipunculide to which it belongs, but also in tracing the evolution step by step.

In the cavity of the body of *Actinotrocha* there is a long convo-